



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/841,580

04/24/2001

Andrea Califano

YOR920000687US2

5406

48062 7590 10/21/2008
RYAN, MASON & LEWIS, LLP
1300 POST ROAD
SUITE 205
FAIRFIELD, CT 06824

EXAMINER

CLOW, LORI A

ART UNIT

PAPER NUMBER

1631

MAIL DATE

DELIVERY MODE

10/21/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/841,580	Applicant(s) CALIFANO ET AL.	
	Examiner LORI A. CLOW	Art Unit 1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 17-19, 23-25 and 29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 17-19, 23-25, and 29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1631

DETAILED ACTION

Applicants' response, filed 16 July 2008, has been fully considered. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

Claims 1-3, 17-19, 23-25 and 29 are currently pending. Claims 4-16, 20-22, and 26-28 have been cancelled.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-3 and 29 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-3 and 29 are non-statutory because they read on abstract ideas. The prohibition on patenting abstract ideas has two distinct aspects: (1) when an abstract concept has no claimed practical application, it is not patentable; (2) while an abstract concept may have a practical application, a claim reciting an algorithm or abstract idea can state statutory subject matter only if it is embodied in, operates on, transforms, or otherwise is tied to another class of statutory subject matter under 35 U.S.C. §101 (i.e. a machine, manufacture, or composition of matter). (Gottschalk v. Benson, 409 U.S. 63, 175 USPQ 673, 1972).

Claims 1-3 and 29 are not so tied to another statutory class of invention because the **method** steps that are critical to the invention are "not limited to any particular apparatus or

Art Unit: 1631

machinery." Claim limitations directed to obtaining or outputting data using an apparatus or machine are considered insignificant pre-solution and post-solution activity. This rejection could be overcome by amendment of the claims to require that critical limitations of the process: (1) are achieved using a particular machine, or (2) the process creates or involves a composition of matter or manufacture. (*Gottschalk v. Benson*, 409 U.S. 63, 175 USPQ 673, 1972), provided such support is found in the specification as originally filed so as not to introduce new matter.

Outstanding rejections under 35 USC 101 pertaining to claims 17-19 and 23-25

The outstanding rejections under 35 USC 101 pertaining to claims 17-19 and 23-25 are hereby withdrawn in view of the amendments to the claims such that the output step is "output to a user".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

Art Unit: 1631

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 1-3, 17-19, 23-25, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,882,990 (Barnhill et al.; filing date of 7 August 2000), for the reasons set forth in the previous Office Action and re-iterated below.

The instant claims, as amended, are drawn to a method, system, and article of manufacture for characterizing gene expression comprising determining gene expression signals for a gene as control data and phenotype data; transforming the control data such that it has a uniform distribution, applying it to the phenotype data to get values; using the values to establish gene patterns through a pattern-finding algorithm; and characterizing the patterns.

The '990 patent discloses systems and methods for enhancing knowledge discovery using support vector machines (abstract). Specifically, in regard to claims 1, 17, and 23, '990 teaches preprocessing training data (fairly reading on "control data") sets such that flawed data are corrected (column 5, lines 17-20). The data consist of data generated from genomic and proteomic studies, for example, thus meeting the limitation of "gene expression" data (column 4, lines 17-29; outlining the gene expression data papers of Golub; Brown etc.). Test data are also

Art Unit: 1631

preprocessed, as described at column 5, lines 45-49, reading on the limitation of a "phenotype data". The "preprocessing" of data includes transforming data using a plethora of means, as outlined at column 16, lines 45-67 to column 15, lines 1-19. Trained leaning machine algorithms are then applied to "unknowns" to establish patterns in the data (column 10, lines 57-61), thus meeting the limitations of the instant claims. Finally the patterns may be displayed, as also required by the claims (column 6, lines 31-32).

In regard to claims 2, 18, and 24, the '990 patent discloses that multiple samples may be analyzed, as disclosed by multiple learning machines (column 6, line 41). '990 also discloses changing the number of observations of an input point, thus expanding dimensionality, which could also be interpreted as "transforming an additional sample" (column 14, lines 23-27).

'990 does not specifically disclose transformation which includes transformation to a uniform distribution within an interval, as in claims 1, 17, 23, and 29, however, '990 teaches that the expansion of data may comprise applying any type of meaningful transformation to the data and that the criteria for doing so really depends upon the type of data and the knowledge sought from the data. Therefore, it would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to have utilized a transformation that included uniform distribution in order that data analysis be optimized. One of skill in the art would have had reasonable expectation of success with such a technique, because '990 states that it would be reasonable to use any transformation technique. '990 outlines several, and states that the list is not exhaustive, rather other transformation may be used, as well as combination of transformation techniques (column 14, lines 65-67).

Response to Applicant's Arguments regarding Barnhill (US 6,882,990)

1. Applicant argues that the “Barnhill reference does not teach or disclose transforming a probability density distribution for data to a uniform probability density for that data” rather the Barnhill reference preprocessing includes ‘identifying missing or erroneous data points and taking appropriate steps to correct the flawed data or as appropriate remove the observation or the entire field from the scope of the problem’.

This is not persuasive. The Barnhill reference discloses preprocessing training data that can include “identifying missing or erroneous data points and taking appropriate steps to correct the flawed data or as appropriate remove the observation or the entire field from the scope of the problem” (column 5, lines 17-21), as pointed out by Applicant above. In addition, the preprocessing of data may also include “adding dimensionality to each training data point by adding one or more coordinates to the vector. The new coordinates may be derived by applying a transformation to one or more of the original coordinates. The transformation may be based on expert knowledge, or may be computationally derived” (column 5, lines 21-31).

Therefore, “preprocessing” of data, as disclosed by Barnhill is not limited to only identifying missing or erroneous data, but also includes data transformation of data points, which applies to the instantly claimed limitation. The fact that Barnhill does not specifically disclose transformation of a probability distribution to a uniform distribution is not relevant, as was discussed previously. The Examiner stated that Barnhill does not specifically disclose transformation which includes transformation to a uniform distribution within an interval, as in claims 1, 17, 23, and 29, however, Barnhill teaches that the expansion of data may comprise applying **any type of meaningful transformation** to the data and that the criteria for doing so

Art Unit: 1631

really depends upon the type of data and the knowledge sought from the data. Therefore, it would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to have utilized a transformation that included uniform distribution in order that data analysis be optimized. One of skill in the art would have had reasonable expectation of success with such a technique, because Barnhill states that it would be reasonable to use any transformation technique. Barnhill outlines several, and states that the list is not exhaustive, rather other transformation may be used, as well as combination of transformation techniques (column 14, lines 65-67).

2. Applicant argues that “applying an algorithm to ‘unknowns’ to establish patterns does not teach the specific limitation of comparing gene expression patterns of an unknown sample with gene expression patterns that characterize control data and the phenotype data to classify the unknown sample as similar to either the control or the phenotype or neither”.

This is not persuasive. Barnhill discloses a method and system for using a learning machine and support vector machine for diagnosing and prognosing changes in a biological system. The method is generally applicable to **any** biological data, including such data from tissue samples of disease and healthy individuals (column 9, Fig. 26, 30, 33; column 10, lines 36-51; column 12, lines 34-36; column 13, lines 21-39). Therefore the “data” of Barnhill is data relating to phenotype of an organism or tissue from a healthy cell or unhealthy cell and the data that is used for the “control” and “test” data come from such biological information. The transformation and expansion of data is relative to the data that is “input” into the system and the criteria for determining if the transformation is meaningful in the context of the data is dependent upon the knowledge sought (column 14, lines 40-67).

Art Unit: 1631

Conclusion

No claims are allowed.

Inquiries

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the PTO Fax Center. The faxing of such papers must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993) (See 37 CFR § 1.6(d)). The Central Fax Center Number is (571) 273-8300.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lori A. Clow, Ph.D., whose telephone number is (571) 272-0715. The examiner can normally be reached on Monday-Friday from 10 am to 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached on (571) 272-0720.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

October 22, 2008

/Lori A. Clow, Ph.D./

Primary Examiner, Art Unit 1631